

Name: Solutions / Answers

Directions: Show all work and each step in the process of solving.

1. Solve $\frac{6}{x+2} = \frac{9}{x+3}$

LCD: $(x+2)(x+3)$

$$\cancel{(x+2)}\cancel{(x+3)} \cdot \frac{6}{\cancel{x+2}} = \frac{\cancel{(x+2)}\cancel{(x+3)} \cdot 9}{\cancel{x+3}}$$

$$(x+3)6 = (x+2)9$$

$$6x + 18 = 9x + 18$$

$$\begin{array}{r} -18 \\ 6x = 9x \\ -6x = -6x \\ 0 = 3x \\ \frac{0}{3} = \frac{3x}{3} \end{array}$$

$$0 = x$$

$$\{0\}$$

2. Solve $\frac{4y+1}{3} - \frac{2y+1}{5} = \frac{3}{5}$

LCD: 3·5

$$\cancel{3} \cdot 5 \cdot \frac{4y+1}{\cancel{3}} - \cancel{3} \cdot 5 \cdot \frac{2y+1}{\cancel{5}} = \cancel{3} \cdot 5 \cdot \frac{3}{\cancel{5}}$$

$$5(4y+1) - 3(2y+1) = 3 \cdot 3$$

$$20y + 5 - 6y - 3 = 9$$

$$14y + 2 = 9$$

$$14y = 7$$

$$y = \frac{7}{14}$$

$$y = \frac{1}{2}$$

$$\left\{\frac{1}{2}\right\}$$

3. Solve $\frac{9}{10} - y = \frac{4y}{5}$

LCD: 10

$$\cancel{10} \cdot \frac{9}{\cancel{10}} - 10 \cdot y = \frac{2}{\cancel{10}} \cdot \frac{4y}{\cancel{5}}$$

$$9 - 10y = 2 \cdot 4y$$

$$\begin{array}{r} 9 - 10y = 8y \\ +10y \quad +10y \end{array}$$

$$\frac{9}{18} = \frac{18y}{18}$$

$$\frac{1}{2} = y$$

$$\left\{\frac{1}{2}\right\}$$

4. Solve $\frac{5x-70}{x-14} = 5$

LCD: $x-14$

$$\begin{aligned} \cancel{(x-14)} \cdot \frac{5x-70}{\cancel{x-14}} &= \cancel{(x-14)} \cdot 5 \\ 5x-70 &= (x-14) \cdot 5 \\ 5x-70 &= 5x-70 \\ 0 &= 0 \\ \{ \text{All real } \#s \} \\ x &\neq 14 \end{aligned}$$

5. Solve $\frac{6x-78}{x-13} = 7$

LCD: $x-13$

$$\begin{aligned} \cancel{(x-13)} \cdot \frac{6x-78}{\cancel{x-13}} &= \cancel{(x-13)} \cdot 7 \\ 6x-78 &= (x-13)7 \\ 6x-78 &= 7x-91 \\ +91 \quad +91 \\ 6x+13 &= 7x \\ -6x \quad -6x \\ +13 \neq x &\text{ no solution} \end{aligned}$$

6. Solve. $\frac{2}{3} = \frac{5w+4}{6+7w}$

LCD: $3(6+7w)$

$$\begin{aligned} \cancel{3(6+7w)} \cdot \frac{2}{\cancel{3}} &= \cancel{3(6+7w)} \cdot \frac{5w+4}{\cancel{6+7w}} \\ (6+7w) \cdot 2 &= 3(5w+4) \\ 12+14w &= 15w+12 \\ -12 \quad -12 \\ 14w &= 15w \\ -14w \quad -14w \\ 0 &= 15w \\ \frac{0}{15} &= \frac{15w}{15} \\ 0 &= w \end{aligned} \quad \{0\}$$

7. Solve $\frac{21}{h^2} - 1 = \frac{4}{h}$

LCD: h^2

$$\begin{aligned} \cancel{h^2} \cdot \frac{21}{\cancel{h^2}} - h^2 \cdot 1 &= \cancel{h^2} \cdot \frac{4}{\cancel{h}} \\ \frac{21}{\cancel{h^2}} - \cancel{h^2} &= h \cdot 4 + h^2 - 21 \\ -21 \quad +h^2 \\ 0 &= h^2 + 4h - 21 \\ 0 &= (h+7)(h-3) \\ \{-7, 3\} \end{aligned}$$

8. Solve $4 = \frac{21}{x} - x$

LCD: x

$$x \cdot 4 = \cancel{x} \cdot \frac{21}{\cancel{x}} - x \cdot x$$

$$4x = 21 - x^2$$

$$0 = 21 - x^2 - 4x$$

$$-1(0 = -x^2 - 4x + 21)$$

$$0 = x^2 + 4x - 21$$

$$0 = (x+7)(x-3)$$

$$\{-7, 3\}$$

9. Solve. $1 + \frac{2}{y} = \frac{4}{y-3}$

LCD: $y(y-3)$

$$y(y-3) \cdot 1 + \cancel{y(y-3)} \frac{2}{\cancel{y}} = y \cdot \cancel{y(y-3)} \frac{4}{\cancel{y-3}}$$

$$y(y-3) + 2(y-3) = y \cdot 4$$

$$y^2 - 3y + 2y - 6 = 4y$$

$$y^2 - y - 6 = 4y$$

$$y^2 - 5y - 6 = 0$$

$$(y-6)(y+1) = 0$$

$$\{6, -1\}$$

Optional Extra Credit

Solve $\frac{2}{x+1} - \frac{1}{x} = \frac{1}{6}$

LCD: $6x(x+1)$

$$\cancel{6x(x+1)} \frac{2}{\cancel{x+1}} - \cancel{6x(x+1)} \frac{1}{\cancel{x}} = \cancel{6x(x+1)} \frac{1}{\cancel{6}}$$

$$6x \cdot 2 - 6(x+1) = x(x+1)$$

$$12x - 6x - 6 = x^2 + x$$

$$6x - 6 = x^2 + x$$

$$6x = x^2 + x + 6$$

$$-6x$$

$$0 = x^2 - 5x + 6$$

$$0 = (x-2)(x-3)$$

$$\{2, 3\}$$